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The Archaeology of Second World War U-boat Losses in the English Channel and its Impact on the Historical Record

Innes McCartney

This article examines how the archaeological record of 33 U-boats sunk in the English Channel during the Inshore Campaign, June 1944 to May 1945, compares with the assessment of U-boat destructions made by the Admiralty's Anti U-boat Division (AUBD) in 1946. Comparison of the two shows an accuracy rate of 57 per cent across the entire Inshore Campaign, compared to ASD's overall accuracy rate in the First World War of only 48 per cent. Crucially, the Inshore Campaign, when studied as two distinct phases (broadly 1944 and 1945) reveals the close relationship between accurate assessments of U-boats destroyed and detailed signals intelligence. It shows that, in 1944 in the English Channel, AUBD was 81 per cent correct in establishing where the U-boats were destroyed. This is for the main part down to the role Bletchley Park and the Secret Room played in decrypting U-boat radio signals, and the Operation Intelligence Centre (OIC) in co-ordinating the ASW effort during Operation Neptune. Such an accuracy rate represents total domination of the battlefield. By comparison, a lack of signals intelligence during 1945 caused by U-boat radio silence led to a drop in AUBD's accuracy to only 36 per cent: even lower than the First World War. This shows the significant role signals intelligence played in tracking, hunting, and destroying U-boats, and being able to know when a sinking had occurred. The results show the crucial role ULTRA intelligence played during the key months of Operation Neptune and how it was used to target specific U-boats in transit to their operational areas.

Key words: maritime heritage, naval history, Admiralty, U-boats, Operational Intelligence Centre, Bletchley Park, Royal Navy, Operation Neptune, Inshore Campaign, Kriegsmarine

This article is a chronological follow-on from a previous article, which examined the losses of U-boats in the same geographic area during the First World War.¹ In that case, the 35 U-boat wrecks present were found to conform to the Antisubmarine Division's (ASD) final assessment of 1919 (the '1919 list') as to where they were sunk only 48 per cent of the time, with 11 of the surveyed U-boat wrecks bearing no relation whatsoever to the 1919 list. The same methodological approach is adopted in this article, comparing the extant remains of Second World War U-boats with the list of U-boats destroyed promulgated by AUBD in 1946 (the '1946 list').² This was done for consistency and in order for direct comparisons to be made between the two World Wars.

1 McCartney, 'The Archaeology of First World War U-boat Losses'.

2 The National Archives, Kew (hereafter TNA), ADM 199/1789.

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Figure 1 A side scan sonar image of the wreck of 'U480'. The bow is to the right, and the left end pointing north shows where the stern was blown off. To the right of the conning tower on the port side of the foredeck is the snorkel, indicated by the arrow. The Second World War-era U-boat wrecks in the English Channel carry this feature, denoting that they were sunk during the Inshore Campaign when this technology was widely employed. (MSP/Author)

In both cases, the UK Hydrographic Office shipwreck database provided the underlying data upon which the physical surveys of the wrecks were based. All of the Second World War-era U-boat wrecks in the English Channel (aside from *U40*, mined off Calais in 1939, and which thus does not feature in this study) were found to have been destroyed during the final phase of the U-boat war, which is generally referred to as the 'Inshore Campaign', beginning in June 1944 and continuing until the end of the war. The Inshore Campaign is characterized by individual U-boat operations, carried out in mainly coastal waters, during which U-boats employed the snorkel as a means of remaining submerged as much as possible (figure 1).

Archival background and the assessment process

As the Inshore Campaign drew on, the U-boats become increasingly challenging to track at sea. The strategic response to the Inshore Campaign in UK waters was co-ordinated by the Admiralty in London based on intelligence prepared by the Operational Intelligence Centre (OIC). The OIC can be seen as the fully evolved version of Room 40 of 1918. It processed intelligence from myriad sources, not least Special Intelligence from Station 'X' at Bletchley Park, and provided strategic and tactical situational briefings to frontline commands. This much is known, but much of the day-to-day details of its activity are not represented in archives because its 'out' signals and war diary were deliberately burned at the end of the war.³ The 'H' (for 'home') Series of out bulletins does, however, survive and is almost unique in providing a picture of OIC's view of U-boat movements during the Inshore Campaign.⁴

The 'H' Series reveals that the Inshore Campaign was fought against the background of increasing abandonment of radio transmissions to and from U-boats at sea; in intelligence terms, this is a key feature of the period.⁵ In fact, the Inshore

³ Beesley, *Very Special Intelligence*, 261–2.

⁴ TNA: ADM 223/195 to 223/309, 'H' Series June 1944 to March 1945.

⁵ Beesley, *Very Special Intelligence*, 248.

Campaign is best viewed as falling into two distinct phases. The first runs from D-Day to September 1944, when the U-boats were driven out of France by the advance of the American army. The second then begins in October, when U-boats could operate solely from Germany and Norway. During the first phase there is significantly more radio use by U-boats at sea and U-boat Command (Befehlshaber der U-Boot, BdU) ashore than is seen in the second, when sealed orders and minimal radio use become the operational norm. The 'H' Series reflects this drop-off in radio intelligence and the consequential reduced accuracy with which U-boats were being tracked at sea.

Documentary evidence on the movements of U-boats from German sources is primarily derived from the BdU war diary (*Kriegstagebuch*: KTB), with its daily estimates of where it thought U-boats were operating.⁶ Of course, it had very limited visibility of those destroyed on operations, and its accuracy as a guide to U-boat locations day by day is generally poorer than the 'H' Series. Moreover, the BdU KTB does not survive past 15 January 1945, after which date it is presumed to have been destroyed. The Naval Historical Branch (NHB) in conjunction with the Air Historical Branch (AHB) compiled a reconstruction on the BdU KTB from January to May 1945, based on intelligence sources.⁷ However, it is by the admission of its authors to be used with extreme caution, and in need of a complete revision which was never carried out.

The classification of U-boat loss assessments carried out by AUBD during the Second World War was a development of a similar system used in the First World War.⁸ The assessment lettering was as follows:⁹

- A (Known Sunk) was attributed only when conclusive evidence was available that a target was destroyed
- B (Probably Sunk) was attributed when the committee believed the attack sunk the target, but they did not have enough evidence to give an A
- C (Probably Damaged) promising attacks that could be A or B, but do not have enough supportive evidence
- D (Probably Damaged) enough to return the submarine to base
- E (Probably Slightly Damaged)
- F (Insufficient Evidence of Damage)
- G (U-Boat Present, No Damage)
- H (Insufficient Evidence of the Presence of a U-Boat)
- I (Target Attacked Not a Submarine)

In reality, during the latter months of the Inshore Campaign the AUBD assessments which were formally written up by the end of the war fall into only the A and B categories (see table 1 below), with time and resources permitting the others only to be entered on to a list. By June 1945, the process was slowing down: AUBD was run down after VE day and shut after VJ day. Even its director, Clarence

6 National Archives and Records Administration, Washington (hereafter NARA), The Microfilmed Records of the German Navy Roll No. T1022/4066.

7 Naval Historical Branch, Portsmouth (hereafter NHB), *Foreign Documents Section Files, Daily Positions of U-boats 15th January 1945 to 15th May 1945*.

8 McCartney, 'The Archaeology of First World War U-boat Losses'.

9 TNA: ADM 199/1789, Section 2 Part A, 36.

Howard-Johnson, was not allowed to complete the assessment process and analyse the results after that time.¹⁰ This means that there was bound to be some aspects of the late-war assessments which would require revision in the future.

The revision process was originally carried out by both AHB and NHB over the next five decades, but has now been largely curtailed. These formal 'reassessments', when based on provable evidence, were of utility in correcting earlier oversights: for example, the attribution of the loss of *U325* in the Irish Sea was revised once it was realised that surface evidence picked up from the destroyed U-boat belonged to a crew member of *U246*. This tallied with a previously-overlooked decrypted signal showing that *U325* had been ordered to operate in the English Channel, not the Irish Sea. *U246* had been listed as sunk in the English Channel in a case which was reattributed to *U1169*.¹¹ During the past two decades, the historian Axel Niestlé has also been active in this field, also making numerous changes to the historic record.

However, in the absence of provable archival or archaeological evidence, the challenges in making lasting changes to the historic record are significant, as the case of *U325* serves to illustrate. The probable fate of this U-boat has been the subject of 'assessment' on no more than six occasions and still remains unproven. Figure 2 depicts the locations where *U325* has been assessed to have been sunk between 1945 and 2014, as promulgated by AUBD, AHB, NHB and Niestlé.¹² The first two assessments were made solely on the basis of evidence from archival sources, as described. The discovery of the first of four mystery U-boats (three of which are from the Inshore Campaign, see figure 7 below) off North Cornwall led NHB to speculate in 1997 that the boat in question must be *U325*.¹³ Not persuaded by this, Niestlé considered that *U325* could have been lost anywhere after its last radio transmission to its patrol area to an unknown cause.¹⁴ After archaeological surveys of all of the north Cornwall sites by the author, the most northerly of them initially seemed to be a good fit for *U325*.¹⁵ However, this has been overturned by better evidence, and *U325* is now considered to be at point '6',¹⁶ but is still not archaeologically provable beyond doubt and probably never will be.

The archaeological record of U-boat wrecks 1944–5 in the English Channel

In 1997 the author began to survey and record by diving the submarine wrecks in the English Channel when it was observed that, similarly to First World War, there was a considerable disparity between the distribution of the actual wrecks and 1946 list. The fieldwork took place between 1997 and 2013, with the U-boat wreck sites

10 Churchill Archives Centre, Cambridge, GBR/0014/HWJN, Papers of Rear-Admiral Clarence Howard-Johnston.

11 NHB, FDS Foreign Documents Section Files, Revisions to Axis Submarine Losses (updated on 22 Jul. 1997).

12 TNA: ADM 199/1789; NHB, FDS110, Foreign Documents Section Files, Queries on FDS 96/55; NHB, FDS Revisions to Axis Submarine Losses 1997; A. Niestlé, *German U-boat Losses During World War II* (1998 and 2014); A. Niestlé, *The loss of 'U325', 'U400' and 'U1021'*, (2007), unpublished copy in the author's collection.

13 NHB FDS Revisions to Axis Submarine Losses, 1997.

14 Niestlé, *German U-boat Losses During World War II* (1998), 102.

15 Niestlé, *The loss of 'U325', 'U400' and 'U1021'*.

16 Niestlé, *German U-boat Losses During World War II* (2014), 101.

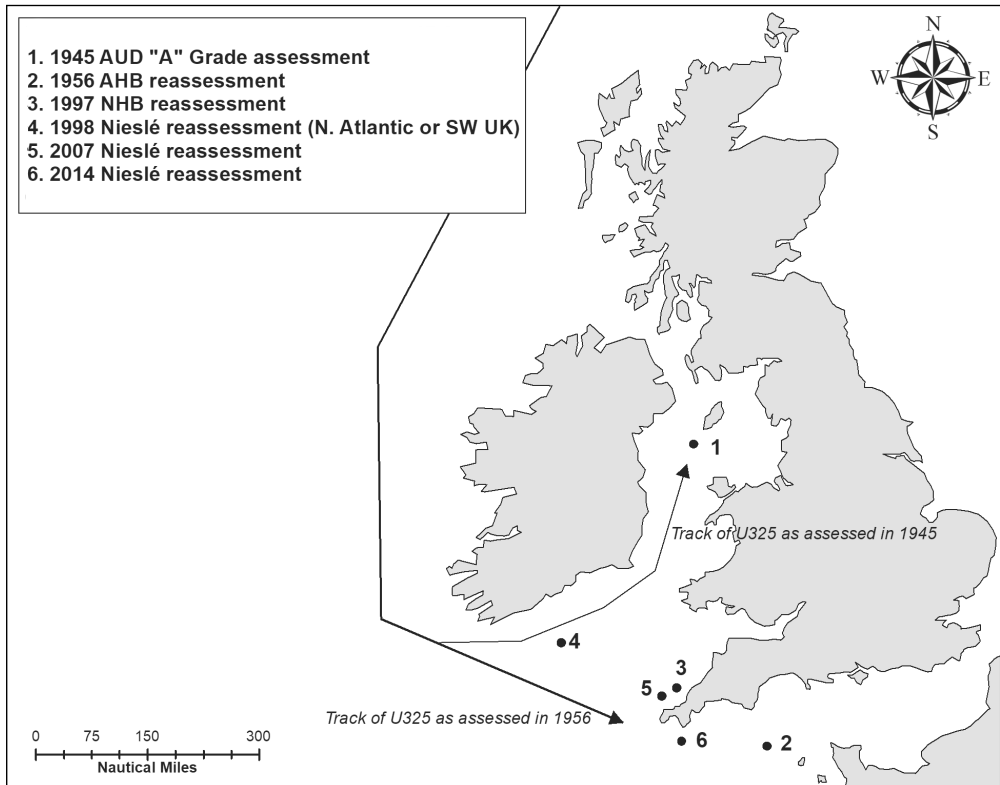


Figure 2 The post-war meanderings of 'U325', based on assessments made on the circumstances of its loss 1945–2014 (Author's artwork)

dived and recorded on video; all of the original fieldwork results and interpretation was originally published in 2014.¹⁷ As archaeological objects, the U-boat wrecks of the Inshore Campaign are very difficult to specifically identify from their physical remains.

Unlike the First World War U-boats, there are no convenient propeller markings to help yield the actual identity of each wreck. Cutting into the wrecks to excavate their interiors looking for absolute proof of their identities is unlikely ever to happen and, as these wrecks are naval graves, would be ethically questionable. The U-boats (with one exception) are all Type VIIC variants, and although there are differences between them, no formal archival records survive to assist in identifying an individual U-boat. Beyond cases where U-boats were provably destroyed beyond doubt as 'A: Known Sunk' losses, yielding survivors, or other material to specifically identify them, ambiguity as to each wreck's specific identity remains in nearly every case.

This is especially so with wrecks which seem to bear no apparent relationship to the 1946 list. These wrecks, termed 'mystery cases', were the most difficult to resolve. In only two instances in the study area was a U-boat specifically identified from its extant material remains. One of these was the 'mystery' wreck of *U480* which was known to have the very rare 'Alberich' rubber coating. The other was

17 McCartney, *The Maritime Archaeology of a Modern Conflict*.



Figure 3 Features on two of the U-boats which conclusively identified them. Left the 'Alberich' rubber coating on 'U480' can be seen once the matting of marine growth covering it has been scraped away. Right the grating on the top of one of 'U214' 's mine chutes. 'U214' was the only Type VIID minelayer lost in the area and was identified beyond doubt by its mine chutes (Author's photograph)

the 'B: Probably Sunk' *U214* which was a rare Type VIID minelayer variant, easily identified by its mine chutes (figure 3).

Therefore, in reality, the archaeological surveys carried out on the wrecks were able to simply say that they were from the Inshore Campaign, determined by the presence of various late-war features, such as the snorkel in its various versions. But, as already noted, a lack of detailed knowledge about the specific technical outfits of each U-boat has effectively precluded positive identification in nearly every case. There have been archival clues and photographic evidence from some of the boats, but they have not been sufficient to make provable identifications and are unlikely ever to be able to.

It should also be noted that unless shown to have been disproved by either archival research or archaeological survey, the 1946 list has been treated by the author as being correct. This means that the proposed identities of the mystery U-boats have not been arbitrarily made by plucking a U-boat out of the historical record and inserting it into the English Channel in an attempt to make it fit the archaeological record. To do this would simply extend the example of *U325* to other cases and would be of dubious value. Accordingly, unless proven incorrect, the 1946 list underpins the evidential basis of the research.

Nevertheless, when a new mystery U-boat has been located, an attempt to place an identity upon it has been made in each case, based on the archaeology present, the historic record and contemporary research, albeit in the knowledge that the outcome cannot be more than an estimate based on the fragmentary archive evidence available to support the archaeological survey work. While some cases appear to be more conclusive than others, the lesson of *U325* leads one to be circumspect about the attributions made and to be clear to the reader (which could include relatives of the dead), what wreck sites are not provably identified. In order to show this, such wrecks have been placed in parentheses. Conversely, wreck sites shown without parentheses can be considered resolved cases. The 2019 list of the 33 Inshore Campaign U-boat wrecks in the English Channel, shown against the background of all 87 U-boat wrecks in the area, is shown in figure 4.

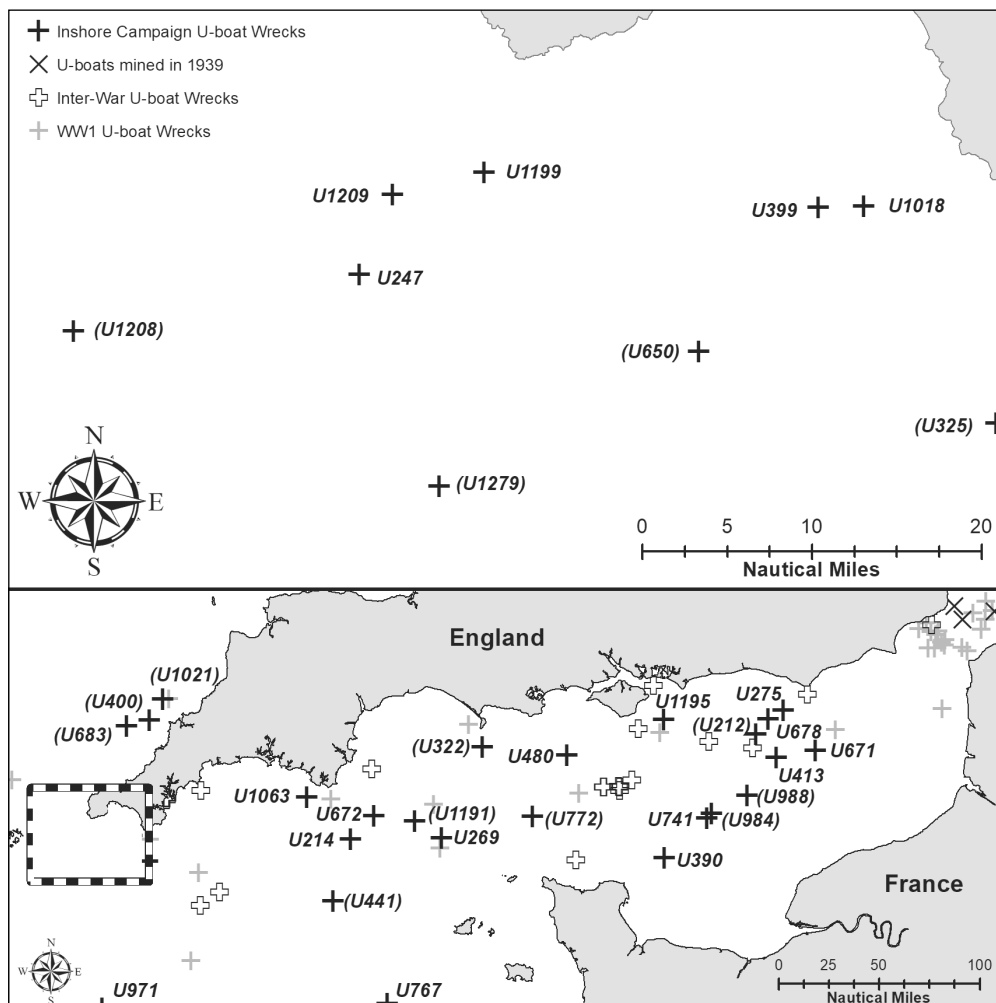


Figure 4 The distribution of U-boat wrecks in the English Channel sunk during the Inshore Campaign 1944-1945 seen in context to the wrecks of all 87 U-boats sunk. The parentheses around some of the wrecks serves to illustrate that their identities are not and will probably never be fully resolved (Author's artwork)

Where archaeology and history diverge: the overall accuracy of the 1946 list

When comparing the 1946 list with the 2019 one, it was anticipated that the differences uncovered would help to open up a new area of research, which would highlight the challenges faced by OIC and AUBD in prosecuting the anti-U-boat effort. It would also allow for an evaluation of their successes and failures and attempt to establish why they occurred. Therefore, to assess the degree of divergence between the 1946 list and the 2019 list, the U-boat wrecks have been segmented into the charts seen in figures 5 to 7, with the overall results displayed in figure 8 and table 1.

Figure 5 shows the cases where the two lists match. This shows the degree of convergence between the two datasets. The 1946 list states that 28 U-boats were

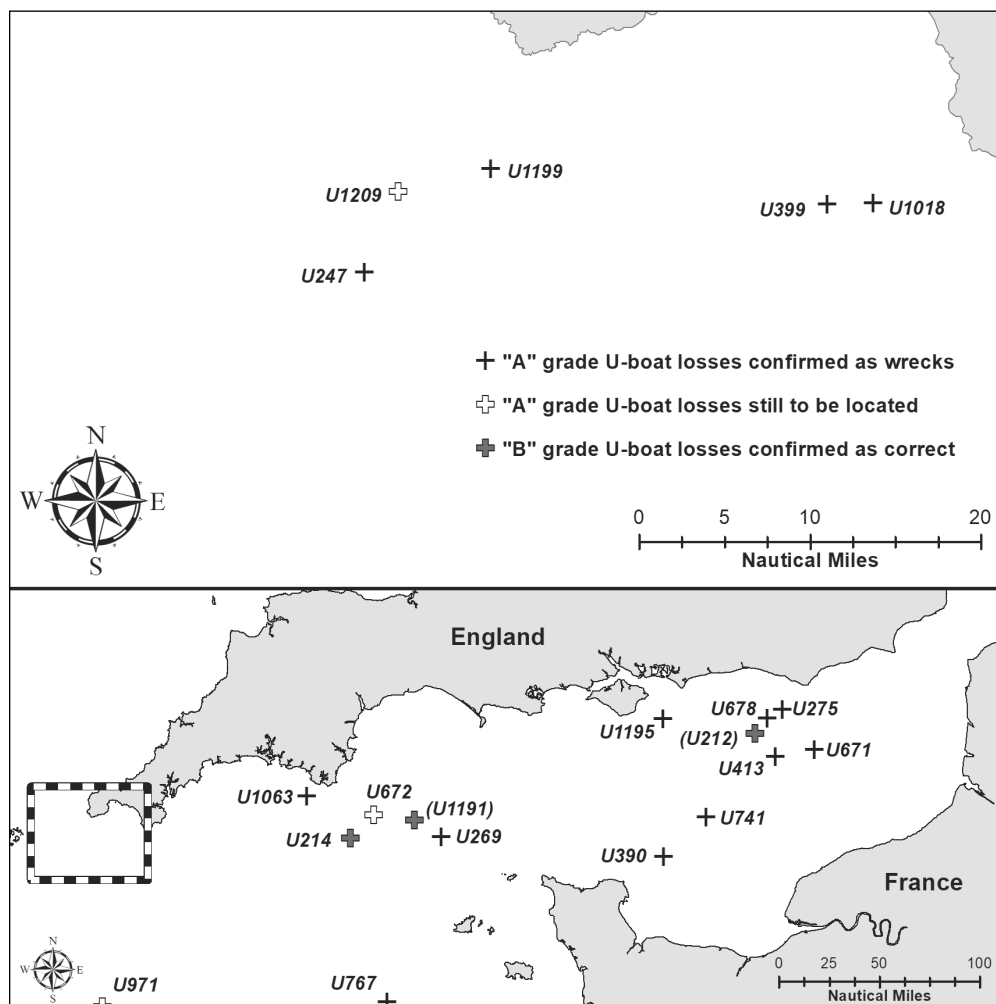


Figure 5 The 20 U-boat wrecks sunk during the Inshore Campaign in the English Channel that match cases published in the 1946 list (Author's artwork)

sunk in the English Channel during the Inshore Campaign: of these cases, only 20 can be matched to the 2019 list. It should be noted that the wrecks of *U214*, (*U1191*) and (*U212*) coincide with 'B: Probably Sunk' assessments. Aside from *U214*, identified by its mine chutes, as described above, while the wrecks are present and have been surveyed, they cannot be provably identified to 'A: Known Sunk' grade, and accordingly retain their parentheses. Moreover, there are three 'A: Known Sunk' cases which are yet to be located. All of these yielded survivors and therefore cannot be anywhere else than in the area where they were noted as destroyed. So, of the 20 wrecks shown, 17 are known sites and 15 of those are 'A: Known Sunk' losses. Therefore, measured against its own list, AUBD was 71 per cent (20 cases out of 28) accurate in assessing the correct fates of the U-boats destroyed in the Channel during the Inshore Campaign. Using the same methodology for the First World War

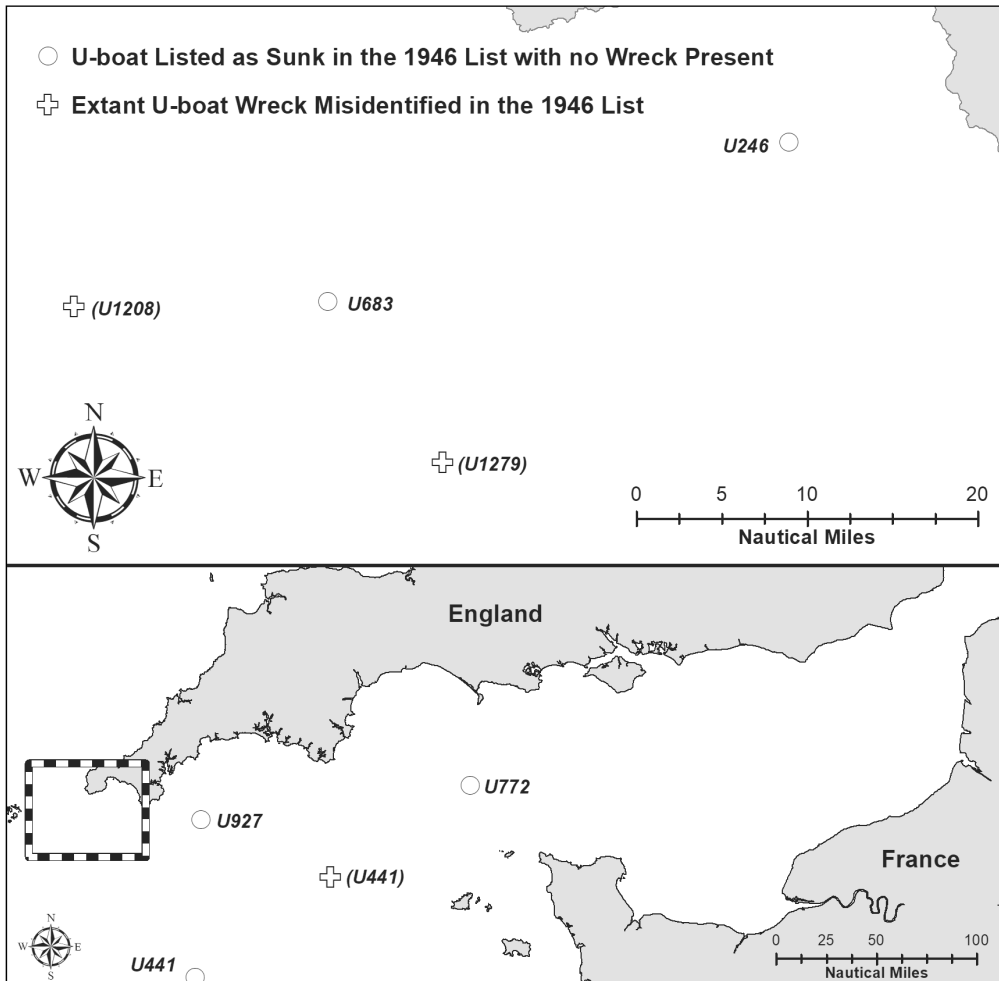


Figure 6 U-boat losses in the 1946 list that are not present as wrecks or were misidentified. The eight cases where the 1946 list does not conform to the archaeological record. In three of these cases AUBD correctly identified a U-boat had been destroyed, but misidentified it (Author's artwork)

U-boat wrecks generated an accuracy rate for ASD of 59 per cent.¹⁸

From the research standpoint, it is the extent to which the two lists do not coalesce which is more educative. The degree of divergence between the datasets is shown in two ways. First, there are cases where a U-boat was not actually sunk or a where a sunk U-boat was misidentified in the 1946 list. These cases are shown in figure 6. These eight cases, when added to the 20 in figure 4 make up the total of 28 U-boats listed in 1946 as lost. All eight of these cases are based on 'B: Probably Sunk' assessments.

Five are not present as wrecks at the locations given, but three of them are in fact mystery sites as shown in figure 7. Accordingly, only two of these five cases

¹⁸ McCartney, 'The Archaeology of First World War U-boat Losses'.

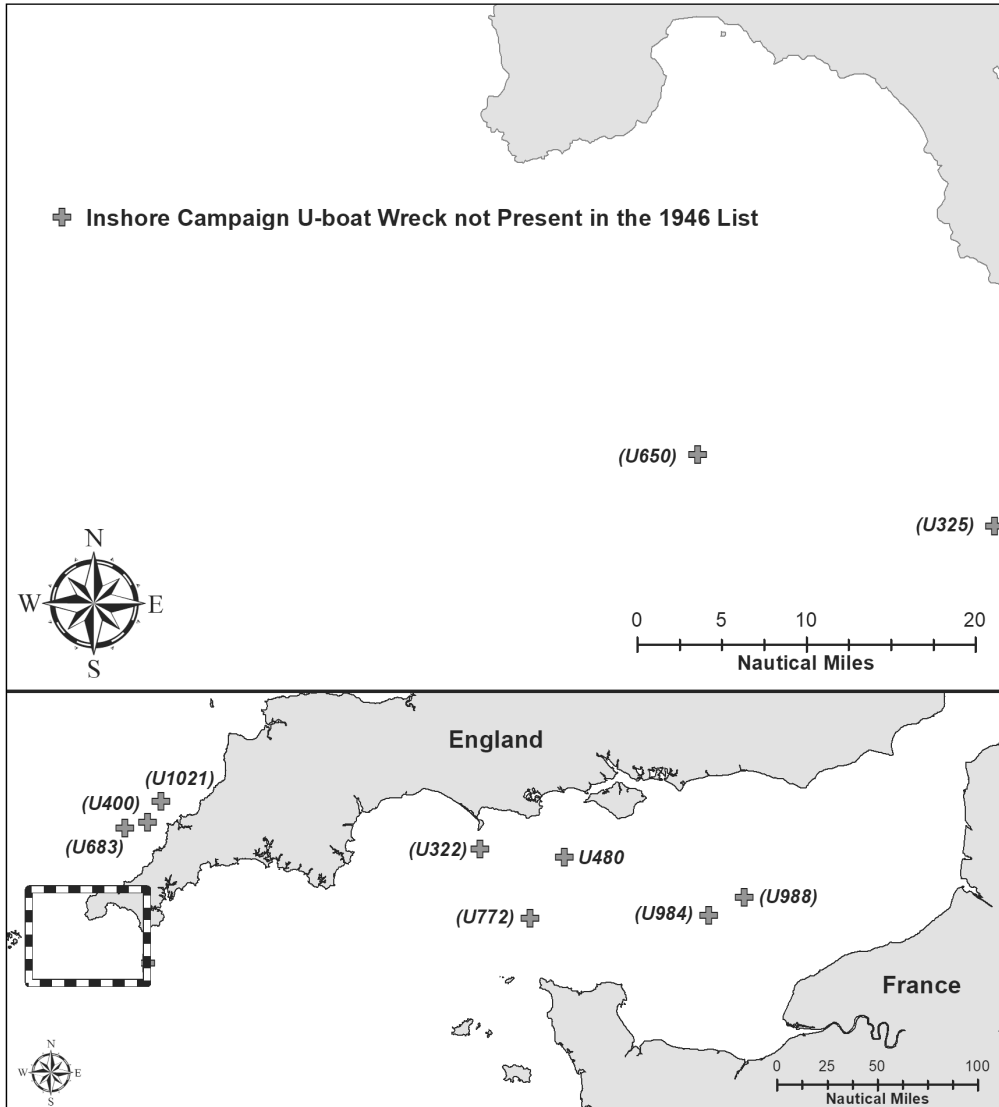


Figure 7 The 10 mystery U-boats in the English Channel which bear no relation to the 1946 list fundamentally affecting its accuracy and raising questions as to why they were overlooked during the assessment process (Author's artwork)

are considered to have been sunk outside of the English Channel; *U246* was lost in the Irish Sea, as described above and there is currently no explanation for the loss of *U927*. The other three wrecks which are extant, have been surveyed and are considered to have been misidentified by AUBD during the assessment process; they are currently considered to be (*U1208*), (*U441*) and (*U1279*).¹⁹ The rubber-coated *U480* was identified off Poole (see above) but was listed in the 1946 list as being sunk where (*U1208*) actually lies.

19 McCartney, *The Maritime Archaeology of a Modern Conflict*.

When looking at the overall accuracy of AUBD assessments in the 1946 list, it could be argued that actual identity was not important to them, so long as it was known that the U-boat in question was destroyed. Therefore, adding the three misidentified losses to the 20 correct cases brings the overall accuracy rate up to 82 per cent (23 cases out of 28). However, this is not the full picture, because during the years since 1946, ten mystery U-boats have been discovered, completely changing the overall results. This is the second measure by which divergence between the 1946 and 2019 lists can be assessed, as shown in figure 7.

Adding together the 20 correct wrecks, the ten mystery sites and eight incorrect cases leads to the final map shown in figure 8. It reveals that there are potentially a total of 38 data points (i.e. alleged plus actual sinking-sites). However, in order to derive an overall accuracy rate it was important not to double-count fates, so *U683*, *U772* and *U441* are only counted once, bringing the total number of cases to 35, of which only 20 were correct, as shown in figure 8. Therefore, in the English Channel during the Inshore Campaign, AUBD was only able to accurately pinpoint the destruction of U-boats in 57 per cent of the cases (20 out of 35). This seems to compare favourably with ASD's performance in the First World War measured using the same methodology which showed it was accurate only 48 per cent of the time.²⁰

So far the overall results have been compared against the 1946 list across the final years of the Second World War. However, much is revealed when comparing them against the two distinct phases of the Inshore Campaign. These are shown in table 1. It reveals that 12 of the 15 inaccurate cases fall into the second phase of the Inshore Campaign. This clearly demonstrates the significance of viable signals intelligence when tracking the movements of U-boats and consequently correctly assessing their fates. In fact, the accuracy rate in the first phase is a remarkable 81 per cent (13 of 16 cases). Conversely in the second phase the accuracy rate slumps to 36 per cent (7 out of 19 cases), lower than for the First World War. This is shown as a pie chart in figure 10.

The accuracy of the assessment process during the Inshore Campaign

It is important to note that, unlike during the First World War, the assessment process appears to have been followed to the letter and no evidence has been uncovered to show that the results were in any way manipulated: the classification of attacks is in all cases as correct as could be expected from the evidence available at the time. Assessments were carried out in batches by a committee of staff-trained officers at AUBD, one of which had access to the OIC out signals. They worked to a process using formalised documentation and produced consistently dependable outcomes up to the end of the war when it was shut down.

The assessment grading of all the cases shown in figure 8 is also shown in table 1. It reveals that nearly all of the wrecks which conform to the 1946 list were cases where the losses were assessed as 'A: Known Sunk'. U-boat wrecks have also been found at three sites listed as 'B: Probably Sunk', with *U214* being positively identified, as described. Another three U-boats were found to exist at sites listed as 'B: Probably Sunk', but appear to have been misidentified according to current thinking on their actual identities.

²⁰ McCartney, 'The Archaeology of First World War U-boat Losses'.

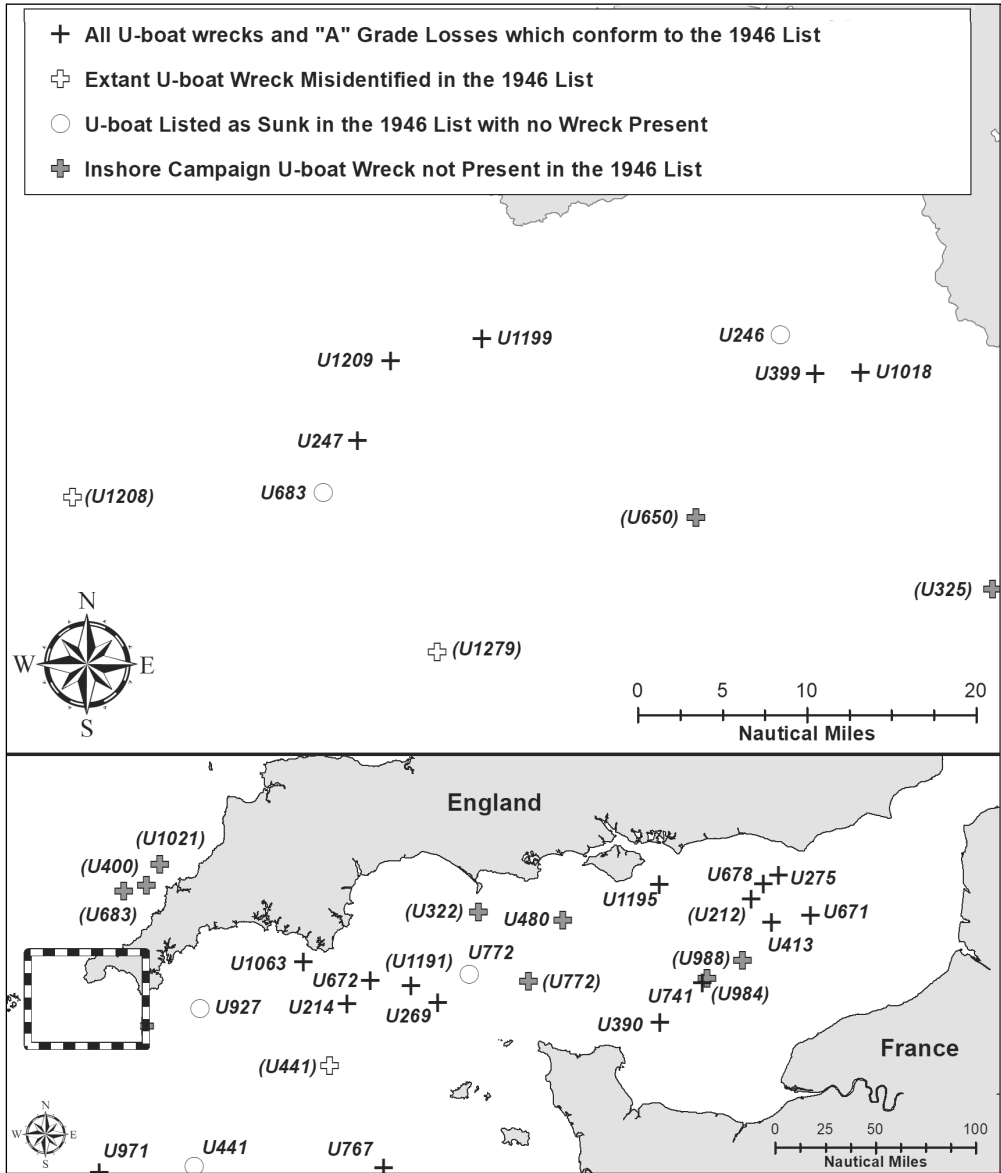


Figure 8 The 2019 archaeological record compared with the 1946 list. The overall picture of U-boat losses in the English Channel during the Inshore Campaign shows that there are 20 correct cases, ten mystery sites, three misidentified sites and two incorrect cases. The 1946 list is 57 per cent correct across all of the Inshore Campaign (Author's artwork)

Conversely, the cases where extant U-boat wrecks do not conform in any way to the 1946 list shows that in eight out of the ten mystery cases, the losses had been graded as 'B: Probably Sunk', with U325 being misidentified and U650 being listed as fate unknown. This serves to illustrate that the assessors were looking at the evidence provided and followed the assessment guidelines and did not succumb to the type of wishful thinking seen in the 1919 list. During the Inshore Campaign, 'A: Known

Table 1 The U-boat losses segmented into the two phases of the Inshore Campaign, showing the 1946 list letter grade assessment in each case*First phase*

<i>Accurate losses</i>	<i>Assessment grade</i>	<i>Inaccurate losses</i>	<i>Assessment grade</i>	<i>Inaccurate category</i>
U767	A	(U441)	B	misidentified
U971	A	(U988)	B	mystery site
U269	A	(U984)	B	mystery site
(U1191)	B			
U390	A			
U678	A			
U672	A			
(U212)	B			
U214	B			
U671	A			
U741	A			
U413	A			
U247	A			

Second phase

<i>Accurate losses</i>	<i>Assessment grade</i>	<i>Inaccurate losses</i>	<i>Assessment grade</i>	<i>Inaccurate category</i>
U1209	A*	(U772)	B	mystery site
U1018	A	(U322)	B	mystery site
U275	A	(U400)	B	mystery site
U399	A	(U650)	Unknown	mystery site
U1195	A	(U1208)	A	misidentified
U1063	A	U480	B	mystery site
U1199	A	(U683)	B	mystery site
		(U1021)	B	mystery site
		(U325)	A**	mystery site
		(U1279)	B	misidentified
		U246	B	not present
		U927	B	not present

A* *U1209* sank after colliding with Wolf Rock. The crew were picked up. As a non-combat loss, this was not graded by AUBD, but for the purposes of this study can be seen as an 'A Known Sunk' loss.

A** This attack led to the loss of *U246*, as described. Since that incident took place outside the study area, in the Irish Sea, the wreck is listed as a mystery site. A wider study area including the Irish Sea would lead to this site being considered 'misidentified'.

Sunk' meant exactly that, and no cases have so far emerged to contradict this. The archaeology is demonstrating that, unlike for the First World War, the assessment guidelines were indeed being strictly observed.

Tracking and intelligence

Another question the archaeology sought to answer was the extent to which the U-boat wrecks were being accurately tracked by OIC at the point of destruction. There is enough data in the 'H' Series to know when OIC was aware of a U-boat being on patrol and whether it knew where the U-boat was bound. Therefore, if OIC knew both of these pieces of information then, for the purposes of this study, it was concluded the U-boat could have been tracked with some degree of accuracy

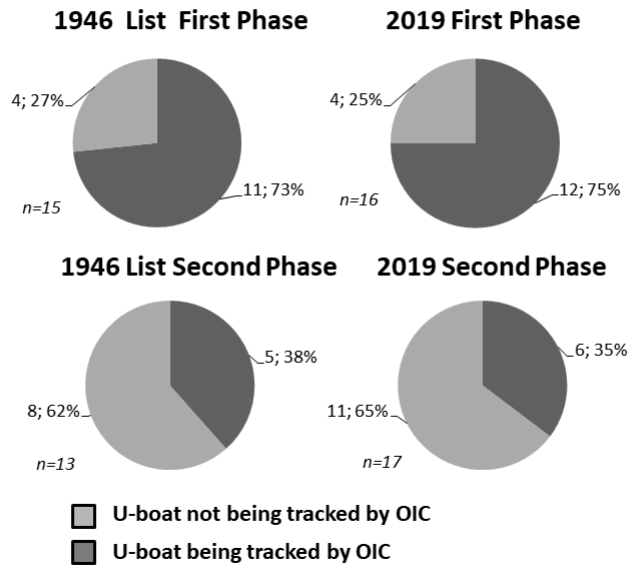


Figure 9 U-boats being tracked by OIC during both phases of the Inshore Campaign as seen. The drop-off in signals intelligence in Phase 2 is significant, increasingly affecting the accuracy of the assessment process during the last months of the Second World War (Author's artwork)

using dead reckoning, as the evidence in the 'H' Series seems to show it was. The results are shown in figure 9.

The data from the 1946 and 2019 lists has been segmented into the first and second phases of the Inshore Campaign. This reveals the difference in the amount of viable tracking data OIC was receiving in each phase. The much higher degree of signals intelligence and hence higher knowledge of U-boat operations during the first phase is clearly shown by the fact that around three quarters of the U-boats destroyed during this phase were being tracked. Conversely, during the second phase this figure halves, resulting in around 35 per cent of U-boats at sea being tracked. Unsurprisingly, there is little variance in the percentages between the 1946 and 2019 lists. This is because, although some of the identities of the U-boats have changed, the background intelligence has not.

The degree to which accurate tracking led to accurate assessments of U-boat losses can be seen in figure 10. The chart is based on the data in table 1. It shows that 65 per cent of the accurate assessment of losses occurred during the first phase of the Inshore Campaign, when it is shown in figure 9 that 75 per cent of the U-boats lost were being tracked accurately. Conversely, 80 per cent of the inaccurate U-boat assessments occurred during the second phase of the Inshore Campaign when accurate tracking of U-boats had halved to only 35 per cent. There is no doubt that there is a direct correlation here. Knowing where a U-boat was or where it was heading offered the opportunity to identify one which was reported sunk. An example of this in practice is the case of (*U212*), which although only graded as a 'B' sinking, was identified when added to the 1946 list, because its progress into its

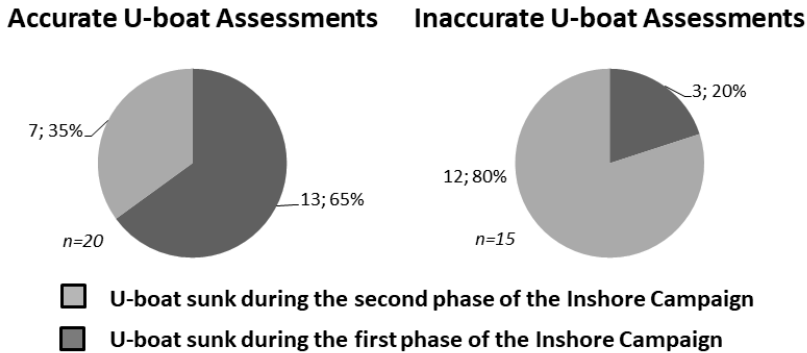


Figure 10 U-boats accurately and inaccurately assessed by AUBD compared against their being sunk in the two phases of the Inshore Campaign (Author's artwork)

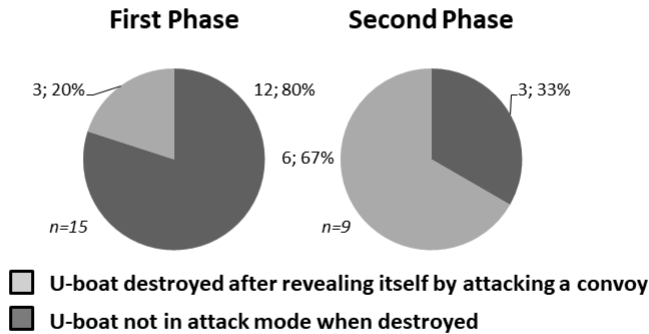


Figure 11 The circumstances by which the U-boats were destroyed by ASW forces in both phases of the Inshore Campaign (Author's artwork)

operational area had been accurately tracked as shown in the 'H' Series.²¹

Accurate tracking data meant that it was possible to directly target U-boats while they were in transit by vectoring ASW units to where they were considered to be positioned at a given time. Due to the destruction of much of OIC's out signals and its war diary (and the fact that real-time intelligence was communicated to frontline commands by telephone), it is now very difficult to directly ascribe the arrival of Special Intelligence into OIC to subsequent direct action which led to the sinking of a U-boat. Nevertheless, it is possible to look at the circumstances in which U-boats were destroyed by ASW forces in both phases of the Inshore Campaign. These circumstances of destruction can be divided into occasions where the U-boat was attacked while acting passively, and occasions where the U-boat revealed its presence by attacking a convoy and was peremptorily sunk. By removing the cases of U-boats which were mined (*U480*, (*U1021*), (*U683*), (*U400*), *U275* and (*U325*)), sunk in collision (*U1209*) or lost to unknown action ((*U984*) and (*U650*)), a list of those purely sunk in ASW actions can be derived. The results of segmenting these data into the two phases of the Inshore Campaign are shown in figure 11.

Importantly, what figure 11 shows is that when tracking accuracy was good, i.e.

²¹ TNA: ADM 223/200, 021325B.

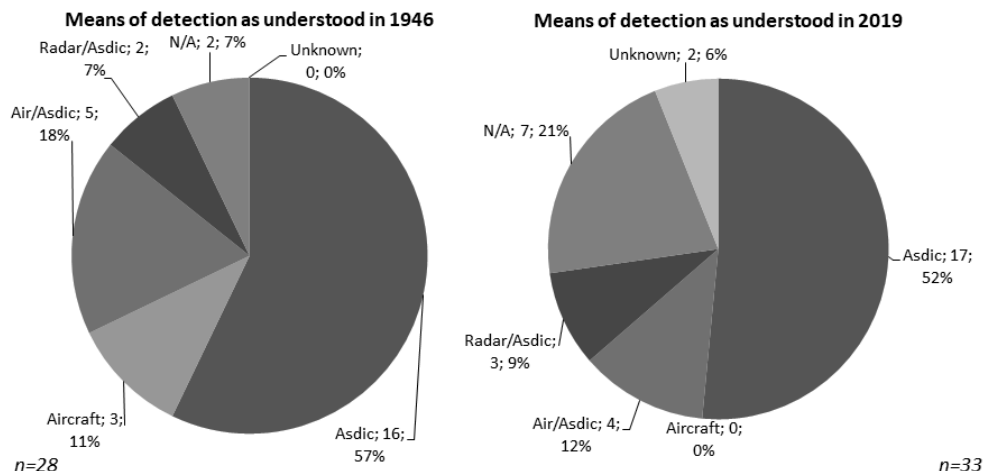


Figure 12 The means by which destroyed U-boats were known to have been detected as understood in 1946 compared with 2019 (Author's artwork)

during the first phase of the Inshore Campaign, 80 per cent of the U-boats sunk were in transit: submerged and wishing to remain undetected. Equally important is the fact that when tracking was not running at high levels, nearly 67 per cent of the U-boats which were destroyed had actually revealed their presence by attacking a convoy, and were sunk as a result. While there may be other factors at play here, including the numbers of ASW vessels available, it is still remarkable that the data clearly reveals a relationship between the availability of accurate tracking and the numbers of U-boats killed in transit. This seems to reveal the presence of the strategy aimed at sinking U-boats based directly on knowing where they are likely to be, and vectoring ASW forces accordingly. This was clearly taking place against the background of regular ASW patrols and convoy-escorting during Operation Neptune and afterwards.

During the compilation phase of this study, an effort was made to try to find direct links between OIC's knowledge of U-boat movements and the direct action which led to their destruction. Only one new example was found: in the case of *U767* the use of DF to vector ASW forces to the location of the U-boat is mentioned in the AUBD Assessment of the sinking.²² However, DF per se was not Special Intelligence, so although in this instance an example of direct intelligence leading to an ASW hunt was found, it was not through decryption of signals. However, NHB successfully identified a case where Special Intelligence *was* used to hunt and kill a U-boat, namely *U247* in the English Channel during the Inshore Campaign.²³ It should also be noted that the surprising closeness of the dates of the laying of minefields and the arrival of the U-boats destroyed in them around the Cornish coast also hints (but can never prove) that the fields were laid in part, as a response to out signals from OIC. The case for the destruction of (*U400*) is notable in this

22 McCartney, *The Maritime Archaeology of a Modern Conflict*, 152.

23 M. Llewellyn-Jones, *On Britain's Doorstep: The hunt for 'U-247', June–September 1944*, (undated). Unpublished manuscript in the author's collection.

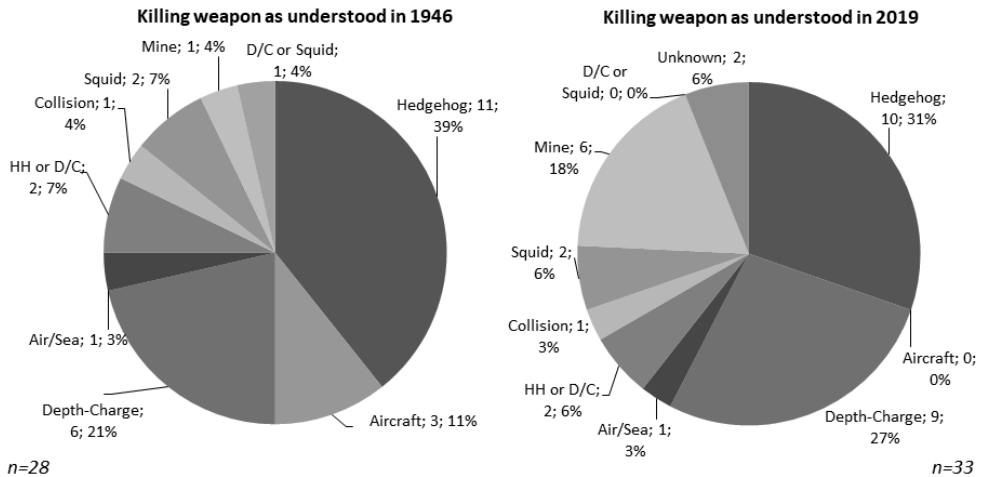


Figure 13 Weapons that destroyed U-boats as understood in 1946 compared with 2019 (Author's artwork)

regard.²⁴ Therefore, in archival terms, there is at least some evidence to show that direct hunting of U-boats based on signals was a feature of the ASW effort during the Inshore Campaign.

The means of destruction

With an archaeological record of destroyed U-boats now in place, and the overall numbers unlikely to change much in the future, it is now also possible to compare what was known in 1946 with what is known now about the efficiency of both U-boat detection methods and the means of destruction. The types of technology used to detect and destroy each U-boat as known in 1946 and in 2019 are shown in figures 12 and 13. Figure 12 shows what was known about the means by which the destroyed U-boats were detected, ASDIC being the predominant detection technology. This is as would be expected in the Inshore Campaign, because the U-boats were submerged at all times. However, the way in which knowledge of other means of detection has changed is revealing. The N/As represent the cases where the destroyed U-boats were not detected at all. This increased incidence seen in 2019 is due wholly to more proofs of mining and clearly shows the destructive potential of the minefields, for which evidence was not available in 1946. This phenomenon is also clearly seen in figure 13.

More surprising is the concurrent reduction in the role of aircraft in detecting U-boats. Detection purely by aircraft disappears completely in the 2019 list, while combined cases are reduced significantly. This is because the research into each U-boat loss has shown that the 1946 attributions of U-boat losses specifically to aircraft attack have not been verified by archaeology. The cases are the complete absence of *U927* as a wreck, the reattribution of (*U772*) to a surface attack and the reattribution of (*U441*) to a combined air and surface attack.²⁵

Figure 13 shows how the understanding of the combination of differing ASW weapons which destroyed the U-boats has changed between 1946 and 2019. It is

²⁴ McCartney, *The Maritime Archaeology of a Modern Conflict*, 237–40.

²⁵ Ibid.

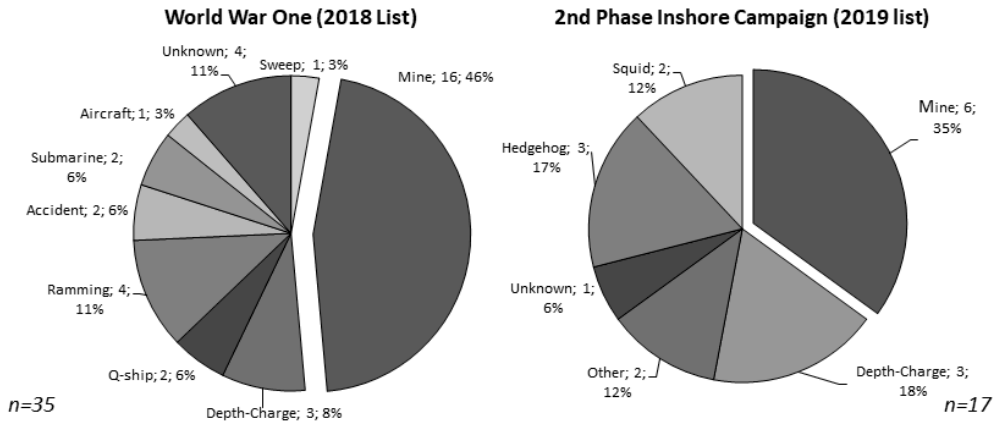


Figure 14 The means of destruction in the English Channel in First World War and the second phase of the Inshore Campaign. The larger portion of losses in both conflicts were to the minefields (Author's artwork)

not surprising that hedgehog and depth-charges would be represented as the most commonly used weapons because the U-boats were submerged at all times during the Inshore Campaign, but what is surprising is the reduction of hedgehog kills in 2019, which is matched by a similar increase in depth-charge kills. This has been caused in part by three of the mystery sites, (*U988*), (*U772*) and (*U322*) having been destroyed in this way, while *U246*, listed in 1946 as destroyed by hedgehog, is now not considered to have been sunk in the area. It seems probable that the AUBD assessors and flotilla commanders regarded the hedgehog as a more reliable weapon (and easier to verify due to the difference in the timings of after-launch explosions in the water column followed by those on the seabed) and considered its use to represent a better chance of demonstrating hits on a target.

The most important change is the increase in the success of mining and the decrease in the success of aircraft as killing weapons. The number of mining casualties increases from one (*U275*) to six (additional (*U683*), *U480*, (*U1021*), (*U400*), (*U325*)) between the two lists and now represents 18 per cent of all the U-boats destroyed. The Inshore Campaign itself was fought around the UK coastline, largely over the same ground as the First World War, and with the knowledge of the efficiency of mines in that conflict (which led to the laying of the Dover Barrage in 1939), the Admiralty again brought the use of defensive minefields into play in late 1944. In this regard, it is particularly interesting to note that it was known that during the First World War, the mine was, in the north-western European theatre, the single most successful antisubmarine weapon of the war, having accounted for 25 per cent of the U-boats destroyed.²⁶ The figure of 18 per cent seen in the study area during the second phase of the Inshore Campaign is similar enough to be worthy of note. The lack of signals intelligence meant that 1945 was in many ways akin to 1918.

In the English Channel, the presence of the Dover mine barrage made destruction by mines in the First World War particularly pronounced, as shown in figure 14. No less than 46 per cent of the First World War U-boats destroyed in the Channel were

²⁶ Ministry of Defence, Directorate of Naval Warfare, 1973. British Mining Operations 1939–1945, (BR1736 (56) (1).

mined. The mining campaign of 1944–5 was aimed at the western entrance to the Channel and the approaches to its ports; the latter were ‘Deep trap’ minefields, laid deep enough for surface ships to pass safely over them. It is interesting to note that their value was misunderstood because there was no proof available in 1946 to show how effective they had been. The Staff History considered it ‘significant’ that two U-boats had been sunk in these minefields (*U260* and *U242* in the Irish Sea).²⁷ That figure has now more than trebled and is a notable outcome of the research.

Conclusion

The creation of a detailed archaeological record of U-boat wrecks derived over 17 years of underwater fieldwork produced a spatial means by which it could be compared to the 1946 list. When tested against the actual U-boat wrecks, it was found to be 57 per cent correct for the English Channel. However, this overall figure tended to obscure the significant change in signals intelligence available to OIC and AUBD during the second phase of the Inshore Campaign. When the two phases were compared, it was revealed that AUBD accurately assessed the destruction of U-boats 81 per cent of the time during the first phase, but only 36 per cent of the time during the second. In many ways the second phase resembles the U-boat war in the English Channel as it was during 1917–18.

In both world wars, the importance of radio intelligence in establishing the disposition of U-boats at sea was a crucial component in beating them. The evidence from the research shows that during the first phase of the Inshore Campaign in particular, high grade signals intelligence was being used to target specific U-boats at sea. This was pioneered in 1918 when some U-boats, such as *UC65* and *UB72*, were sunk as a direct result of signals intelligence.

The recognition of the true danger posed by the Flanders Flotilla’s institution of radio silence has been slow to emerge.²⁸ The experience during the second phase of the Inshore Campaign was in many ways a rerun of the challenges faced in countering the Flanders Flotilla in 1917–18. During this phase U-boats were more likely to be mined or sunk in combat by revealing themselves by attacking a convoy, being difficult to track beforehand.

The overall results seen in the 1946 and 1919 lists were somewhat weakened by the similar tendency to try to sweep up all of the unresolved cases by matching them to known ASW incidents. In UK waters this partly led to the impact of the defensive anti-U-boat minefields being underestimated, as no witnesses were known to exist in five cases where U-boats were destroyed in the minefields.

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²⁷ BR 1736 (56) (1), 765.

²⁸ McCartney, ‘The Archaeology of First World War U-boat Losses’.

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